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ABSTRACT

It is argued that increased use of learner-generated questions and comments can benefit every stage of the instructional process. A strategy is proposed that integrates design into the implementation of instruction. The emerging interest in learner-generated questions has followed the paradigmatic shift in psychology from behaviorism to constructivism. The generative/constructivist learning model is consistent with encouraging learners to become independent by learning how to learn. Developing the ability to monitor one's own comprehension, articulate questions, and explore answers requires time and practice that can be afforded through student journals written as homework. The use of the journal writing approach in a community college setting is described. The superiority of journal writing to the use of adjunct questions is described. A vehicle like the student journal allows the learner to share questions and comments, while the teacher is able to monitor comprehension, identify misconceptions, and empower the learner to complete the task. Recommendations are given for implementing student journal writing. Two tables compare questions and journal entries. (Contains 59 references.) (SLD)

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ED 362 160

Title:

Learner-Generated Questions and Comments: Tools for Improving Instruction

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Introduction

Traditional approaches to instructional design involve needs analysis, selection and sequencing of instructional strategies, and—if time and budget allow—an iterative process of formative evaluation and revision until the instructional package meets some pre-determined criterion for success. There are many problems to such approaches, not the least of which is the fact that formative evaluation often gets short shrift because of time and budget constraints. But a larger problem derives from the behaviorist roots of instructional design. Winn (1990) noted that approaches which are grounded in behavioral theory are "inadequate to prescribe instructional strategies that teach for understanding" (p. 53; see also, for example, Bednar, Cunningham, Duffy, & Perry, 1991). Winn (1990) argued that "design needs to be integrated into the implementation of instruction" (p. 53).

In this paper, I propose one strategy that integrates design into the implementation of instruction. Specifically, I argue that increased use of learner-generated questions and comments can benefit every stage of the instructional process—from design through implementation. My argument assumes that instructional strategies can do double duty. First, they can adapt instruction to students' needs "on the fly," and second, they can provide ongoing formative evaluation.

In the first part of the paper, I show how learner-generated questions and comments are an instance of a larger trend toward constructivism. Second, I describe one use of journals to elicit and respond to questions and comments. Third, I discuss the potential of learner-generated questions and comments in formative evaluation. Fourth, I discuss implications for instruction and learning. Finally, I offer recommendations for incorporating learner-generated questions and comments in the instructional design, development and implementation process.

Limitations of Adjunct Questions

It is a fairly common practice across disciplines to include adjunct questions in the students' text, courseware, or teachers' guides. Yet the research findings on the use of adjunct questions have often been contradictory, with outcomes varying on a wide variety of factors, including the placement of questions, level of questions, and type of learning outcomes (e.g., Lindner & Rickards, 1985). The effectiveness of adjunct questions is also challenged by the literature on individual differences such as motivation, prior knowledge, field dependence/independence. For example, according to Jonassen and Grabowski (in press), the structure which adjunct questions imposes should benefit field dependent students while interfering with the learning of field independent students, who are likely to benefit more from imposing their own structure on material.

Another limitation of adjunct questions is that they identify problems for learners rather than developing the learner's ability to identify problems. Many (e.g., Brown, Campione, & Day, 1981; Duffy & Jonassen, 1992; Frase & Schwartz, 1975; Gagné, 1980; Jonassen, 1985) have argued that the goal of education is to help students become independent learners. And being an independent learner involves not only solving but identifying the problems to be solved (Bransford & Stein, 1984).

In this regard, research has generally overlooked an instructional/learning strategy potentially more important than adjunct questions: learner-generated questions and comments. Depending on their metacognitive sophistication and cognitive orienting tasks (Rigney, 1978), students may generate such questions and comments as they read an assignment, complete an exercise (including answering adjunct questions), participate in class discussion, study for an examination, etc. Research has shown that students' comments, answers and even their questions can influence how

they construct knowledge. For example, Chi and her colleagues' (Chi & Bassock, 1989; Chi, Bassock, Lewis, Reimann, & Glaser, 1989; Chi, de Leeuw, Chiu, & LaVancher, 1991; Chi & VanLehn, 1991) investigated students' self-explanations while studying worked-out physics examples. Chan, Burtis, Scardamalia, and Bereiter (1992) studied how students learn from text. And Feathers and White (1987) focused on students' development of metacognitive awareness in a college developmental reading class. I have been studying students' questions and comments in journals in a college literature course (Cole, 1991,1992).

As Stein and Bransford (1979) observed, "An emphasis on the types of questions students ask themselves may...have important implications for understanding individual differences in learning and retention" (p. 776). Although these differences would seem to have important implications for selection and sequencing of instruction, the traditional instructional design and development process pays little heed to students' questions and comments until the formative evaluation process. (Unfortunately, with the budgetary and time constraints typically imposed on instructional design and development, formative evaluation often gets short shrift, if it is included at all in the process [Martin Tessmer, personal communication, 1991].) In fact, the traditional instructional design and development process often seems to discount the potential of students' comments and questions.[1]

A Limitation of Experts

One of the problems of relying mainly on experts in selecting and sequencing instruction is that they find it difficult to decompose their knowledge, even with the help of designers and developers. Moreover, they are often out of touch with the needs of novices and may hold widely disparate views of the learners' needs.

For example, in a study of students' journals in a college introduction to literature class (Cole, 1992), I had planned to use faculty ratings of story difficulty to guide my selection and sequencing of stories. During the first week of the term, I administered the survey to the other six full-time members of the college-level English program. Four of the teachers had taught full-time at the college more than 20 years; the fifth had taught full time more than 15 years; the sixth had taught full time less than 2 years.

In spite of their expertise, the survey revealed no consensus. The faculty, none of whom used journals in their classes, did not agree unanimously on the rating of any story, although 83% (5 out of 6) did agree on the rating of one story (Faulkner's "The Bear" is Difficult). The faculty ratings for 29% of the 14 stories with which they were all familiar spanned the entire range (Easy, Moderate, Difficult). Including my ratings for those stories increased the disparity to 36%. The range of responses provides further justification of the usefulness of journals in communicating students' difficulties. If teachers with so much experience do not agree on the difficulty level, then at least some of them must have inaccurate schemata of their students' needs.

There is some evidence that journals help "experts" identify the needs of novices. My ratings agreed unanimously with those of a part-time composition/literature teacher who, for several years, has required her students to write journals. A follow-up discussion revealed that we had based our ratings on similar information we had obtained from students' journals more than from class discussions.

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[1]For example, Merrill (Gagné & Merrill, 1991) recently said, "Once in a while I get a good question, but most of the time I don't. Consequently, I don't think the students know what to ask anyway" (p. 31). Merrill is evaluating questions from the perspective of an expert, not from the perspective of a novice or even a journeyman. On the other hand, Scardamalia and Bereiter (1991, p. 37) found that even "children can produce and recognize educationally productive questions and can adapt them to their knowledge needs."

The Paradigm Shift

The emerging interest in learner-generated questions has followed closely on the heels of the paradigmatic shift in psychology from behaviorism to constructivism (Bruning, 1983; Resnick, 1983; also see Duffy & Jonassen, 1992) and the accompanying shift from mathemagenic instruction, which "seek[s] to control the information processing activities of the learner" to generative learning, which places the locus of control in the learner (Jonassen, 1985, p. 127). The generative/constructivist learning model is consonant with encouraging learners to become independent by learning how to learn (e.g., Jonassen, 1985).

"The generative model asserts that learners, when faced with stimuli. . .construct and assign meaning to that information based upon prior learning" (Jonassen, 1985, p. 11). In emphasizing the active role of the learner, the generative model has bearing on many recent focuses in instructional theory and research, from problem-solving, and schema theory, which explains comprehension in terms of the interaction between the reader and the text (e.g., Anderson, 1977; Rumelhart & Ortony, 1977), to the views of transactional analysis, which is applied so well to the study of literature by Rosenblatt (1978). More recent discussions of schemata (e.g., Clancey, 1992) emphasize that they are not stored mental structures but dynamic networks which are "constantly changing and always freshly created (albeit it out of previous activations)" (p. 153). Similarly, Spiro and his colleagues (e.g., Spiro, Coulson, Feltovich, & Anderson, 1988; Spiro & Jehng, 1990) describe a process of schema assembly (forming new schema from parts of many schemata) in ill-defined domains.

As active learners, "people tend to generate perceptions and meanings that are consistent with their prior learning" (Wittrock, 1974, p. 88) and with their "age, subculture, experience, education, interests, and belief systems" (Anderson, Reynolds, Schallert, & Goetz, 1977, p. 378; Bransford & Johnson, 1972). The process seems to require not only constant creation, as noted above, but also reception of information and availability and activation of relevant schemata (as described by Mayer, 1975, 1979, 1980). But, as Anderson et al. (1977) noted, students sometimes do "violence...to the 'data' contained in the text" (p. 371). Thus, it is important to design and develop instruction which can identify problems and support the learning process in a timely manner—that is, to help current students, not merely to improve instruction for future students.

Learner-generated Questions and Comments

One instructional intervention which seems particularly promising focuses on learner-generated questions and comments. The limited research on learner-generated questions has focused primarily on training learners to generate the type of questions that teachers will ask on tests and examinations (e.g., Andre & Anderson, 1978-79; Frase & Schwartz, 1975) or on studying. This approach generally assumes a common level of learner understanding and thus fails to address the individual learner's prior knowledge and misconceptions. Another approach is to study the relationship between question frequency and individual differences, such as prior knowledge (e.g., Miyake & Norman, 1979).

However, focusing narrowly on "questions" overlooks an intuitively more natural strategy of teaching students to articulate and reflect on the questions and comments they have as they try to master a domain.[2] The student's own questions and comments might paradoxically be viewed as enlarging what Vygotsky (1978) called the

[2]The cognitive apprenticeship model (Collins, Brown, & Newman, 1989) is exploring new territory, but does not directly address this issue.

zone of proximal development.[3] When coupled with other instructional/learning strategies, such as journal writing or question sessions,[4] this strategy allows the learner to build more naturally on whatever prior knowledge he/she has, while providing an opportunity for the teacher to monitor the student's comprehension, identify misconceptions, and adjust instruction accordingly.[5] In anonymous evaluations of journal writing, several of my students have commented that the act of writing journal questions helped them focus their attention and sometimes helped them find the answer themselves (Cole, 1991, 1992). Such an approach is a departure from traditional instructional design and development. Fostering students' questions and comments assumes that the selection and sequence of instruction cannot be totally predetermined and that it requires adjustment "on the fly."

A domain-specific strategy? Research must determine whether learner-generated questions and comments are more critical in some domains than in others. However, identifying bugs in procedural knowledge such as arithmetic seems easier (not necessarily easy) than in ill-defined domains such as understanding complex college-level short stories. In arithmetic, the teacher or the student can readily determine *if* the student has arrived at a wrong answer to a problem; and the teacher can identify the error(s) by having the student think aloud while working through a similar problem. Because the procedure for a given problem is clear cut, a computer program can even monitor students' actions, intervene, provide guidance, etc.

Teaching college-level short stories is much more complicated. First, a story may not have a single "correct" meaning; thus the teacher ideally should know not only the student's conclusion, but also his/her reasoning. Similarly, the student may have inferred a "correct" meaning from wrong or incomplete evidence. While solving arithmetic requires knowledge of a well-defined procedure, understanding a complex story is a dynamic process in which the meaning unfolds with each word, each phrase, each sentence, etc. The student may have a weak understanding of grammar (from pronoun use to participial phrases), or may miss a symbol, an allusion or irony. Moreover, the author often delays or even withholds information for artistic or affective purposes. The potential number of errors is infinite.

While students' journals cannot provide insight into every error, they often provide insight into critical problems, which the teacher can explore in class or in tutorial sessions.

Learning to Learn

Developing the ability to monitor one's comprehension, articulate questions, and explore answers requires time and practice. Writing journals as homework gives students adequate time to reflect and to try to answer their own questions. I found (Cole, 1992) that my students' journals contain significantly more comments than

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[3]Vygotsky (1978) defined the zone of proximal development as "the distance between the actual development level as determined by independent problem solving and the potential level of development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (p. 86). Compare Bereiter's (1985) discussion of "the learning paradox."

[4]In their journals, I encourage students to ask any question or write any comment that they believe will help them understand the reading assignment better (with the exception of definitions of words, unless they are unsure of the appropriate definition).

In lieu of at-home journals, at the beginning of a discussion, I occasionally ask students to write the three questions they most want answered about the reading assignment; then I collect them and read them anonymously to the class. Occasionally I just have students ask their questions out loud and I write them on the board.

[5]If many students raise the same issues in their journals, then I respond to the class as a whole. If only a few students raise an issue, then I respond in each journal.

questions, apparently because once students identify a point of confusion most of them try to resolve it. As noted above, students often comment that the act of writing their questions often helps them discover the answers. Journal writing seems to help students expand their own zones of proximal development, making their tacit interpretations explicit and thus available for reflection and analysis. Thus journal writing seems to be an instructional approach that can help learners make the transition from being dependent on others to being able to learn on their own. It helps them move from what Vygotsky (1978) called the *other-directed to self-directed* stages of understanding.

Moreover, journal writing gives *each* student the opportunity to ask questions, try to answer them, and express his/her understanding of a reading assignment. A few students do not have the opportunity to come up with all the questions and answers and make it impossible for other students to contribute to their own understanding. (Even if they have the opportunity in class discussions or in collaborative groups, some students don't take advantage of it, for various reasons, many of which relate to lack of confidence or fear of peer ridicule.) In describing their Jasper series, the Cognition and Technology Group at Vanderbilt (1992) emphasized the importance of each student having the opportunity to contribute to his/her learning. Journal writing, even more than class discussions and collaborative learning, guarantees such opportunities.

Although other instructional strategies theoretically can elicit students' questions and comments (e.g., encouraging students to ask questions in class, and asking students questions), most students, at least those in a community college, seem much more willing to share these privately than in public. (I base this conclusion on 25 years experience as a college composition and literature teacher as well as on student evaluations of journal writing.) Electronic networking provides an alternate vehicle for anonymous sharing of questions and comments (see Hubbard & Duffy, 1991). Unlike adjunct questions, learner-generated questions and comments run little risk of overwhelming low-ability learners or boring high-ability ones.

One Implementation

Setting

In the past eight years, I have incorporated journal writing as an instructional/learning strategy in approximately 30 classes of literature students at Arapahoe Community College, a large, public community college in a white-collar suburb of Denver, Colorado. Composition/literature instructors teach five classes with a maximum of 23 students. Students at the college vary greatly not only in reading ability[6] but also in age, academic majors, world knowledge, and motivation. More than half of the students work. The average age for many years has been at least 28 (spring 1992 it was 31.2), but the distribution is bimodal, with the majority of the day-time students being traditional college age and the majority of the night students being non-traditional age. While most of the students in my literature classes read at or above the 11th-grade level, occasionally a few students read at or below the 9th-grade level. At the other extreme, sometimes half the students read at or above the 16.9th-grade level (the highest level on the exam).

The more journals I read, the more I have become aware of the disparity between (a) the adjunct questions in texts and teachers' guides—resources I had relied on

[6]The college requires all students who enroll in composition to take reading and English placement tests. In addition, I usually administer the Nelson-Denny Reading Test (Form E, 1981 edition) during the first week of my literature classes.

whenever I taught an unfamiliar work—and (b) the types of questions and comments in students' journals. The adjunct questions in most texts and instructor guides tend to address relatively high-level learning outcomes related to aesthetic principles—for example, synthesis and evaluation on Bloom's taxonomy (Bloom et al., 1956) and problem-solving on the Gagné-Briggs taxonomy (Gagné, Briggs, & Wager, 1988).[7] The questions and comments from a whole class generally span Bloom's and Gagné-Briggs' taxonomies, but students' problem-solving efforts tend to focus on what Kintsch (1989) calls the text-base and the situation model rather than on aesthetic principles.

With such a range of questions and comments, it is imperative to be able to identify and respond to individual student needs; yet the nature of community college students presents particular challenges, in addition to the range in their reading abilities. Students often lack confidence to participate in class discussion (even if they read at the highest grade level). Thus if a teacher relies on adjunct questions or teachers' guides to select and sequence instruction, he/she is likely to talk over the heads of many students and bore others.

Journal Methodology

Instructions. Following are the instructions printed on the syllabus of my Introduction to Literature course (I refine the directions from time to time; I use essentially the same instructions in other literature classes):

> Write a journal for each story, at least a half-page long—but there is no maximum length. Write your journal in ink, using complete sentences—otherwise I will not be able to understand what you are asking or saying. Write any questions you have—except the definition of a word, unless you are unsure of the relevant definition—or any comments you would like to make about the story. The journal is not busy work, but is intended to help me know what you need help with in understanding the story. Write any questions you believe will help you understand the story now as well as later, for the examination—or any other questions you are just curious about. Journals are worth a maximum of 10 points each. If a journal meets the minimum requirements, you will receive 7.5 points—a grade of C; you will receive additional credit, depending on how much your questions and comments indicate that you are paying attention to all the elements as you try to understand the story. There are no *wrong* questions or comments (but there are questions and comments which ignore the details of a story). Journals are a tool for you to learn about what you don't know, not to show me that you already know everything. Even if you don't understand a story at all but ask questions about what you don't understand and indicate that you are paying attention to details, you can receive a 10.
>
> I will collect your journals at the beginning of the class on which they are due. If you miss that class, you may submit your journal at the beginning of the next class you attend.

Practice and resources. In addition to these instructions, I usually have students practice writing journals on a haiku poem in class and I read those anonymously to the class. (I begin with a haiku because it is easy to incorporate into one class session.) Then I use students' comments and questions as a basis for helping them understand the poem. Before students write their first out-of-class journal, I provide written descriptions of the processes three former students used in writing

[7]Since most introduction to literature texts are organized by topic (e.g., characterization, theme, and symbolism), adjunct questions in the students' text generally focus on that topic in a single work. There are few if any questions to direct students' understanding of the other topics for that work. Moreover, most of the works have no questions at all.

their journals, and a sample journal. The last two semesters students have also had access to HyperCard tutorials I developed on writing journal questions and writing journal comments (I am experimenting with requiring students to view the programs). After I return the first journals, we discuss any concerns the students have about writing journals. I encourage students to ask questions about the journal-writing process at any time.

Grading. I grade students' journals and return them at the next class, responding in writing and/or in class discussion. Some writers have advocated that journals not be graded; others (e.g., Holland, 1989; Roth, 1985) have said they found grading a necessary incentive. Still others have identified graded journal writing as an incentive for students to read assignments and reflect on them before coming to class (e.g., Bauso, 1988; Schwartz, 1989) and a means of increasing students' confidence in their understanding of the domain (e.g., Zuercher, 1989). Advice on grading and feedback abound (e.g., Bauso, 1988; Myers, 1988; Roth, 1985), yet no one has provided empirical support for particular recommendations.

Maintaining anonymity. Although some teachers (e.g., Fulwiler, 1989; Heath, 1988; Wilson, 1989) have students share their journals with the class, I always maintain the anonymity of students because I found (Cole, 1992) that on evaluations of journal writing some students objected to sharing even though they had not objected when I gave them the opportunity not to share their journals in groups. Moreover, students apparently censure what they write when they know other students will be the audience (Cole, 1992).

Adjunct Questions Versus Student Journals on One Story

A comparison of adjunct questions and student journals on one story illustrates the superiority of the latter in addressing students' needs. Below I compare typical adjunct questions on "The Cask of Amontillado," by Edgar Allan Poe, with excerpts from students' journals; the text my students use does not have adjunct questions on this story. I usually teach this story after students have written several journals. First I list some of the adjunct questions from one text (Table 1) and explain the weaknesses of the questions in addressing students' needs. Then I provide excerpts from students' journals to illustrate students' needs (Table 2).

Table 1. Adjunct Questions on "The Cask of Amontillado" from a Student Text

1. How does Montresor's opening paragraph explain the conflict in the story and foreshadow its resolution?
2. How does Montresor's apparent concern for Fortunato's health enhance the suspense of the inevitable climax.
3. How does the "supreme madness of the carnival season" provide an appropriate environment for Montresor to initiate his plot?
4. Why does Montresor wait a half-century to tell his story?

Critique of Questions in Table 1. The questions in Table 1 reflect the decomposition of the story by an expert. While these are ultimately worthy questions, they do not address the immediate needs of most students as they try construct a basic understanding of the story and of the classic concepts of fiction (e.g., *conflict*). Following is a brief analysis of the problems students would typically encounter in trying to answer the adjunct questions (numbers refer to the questions above).

1. Most students do not understand the text-base of the opening paragraph, particularly the following sentences:

> I must not only punish, but punish with impunity. A wrong is unredressed when retribution overtakes its redresser. It is equally unredressed when the avenger fails to make himself felt as such to him who has done the wrong.

Students typically need help in paraphrasing these sentences; in fact, meaningful discussion of the story *must* begin by helping the student understand the opening paragraphs—otherwise students cannot meaningfully anchor class discussion. Students also have difficulty identifying the *conflict* in a story. Before we ask students to "explain the conflict...and foreshadow its resolution," we should make sure they can identify the conflict (as well, of course, as understanding the concept of *conflict* in a story).

2. Many students miss the irony of Montresor's concern and most are unable to identify the point of climax when I raise that issue in class.
3. Most students have a single, inappropriate schema for "carnival season," one related, for example, to carnivals in shopping malls during the summer rather than to Mardi Gras. Moreover, many of my students do not even know what Lent is.

None of the adjunct questions in the texts I examined addressed two critical passages. Many students ask about the first one in their journals. Because the significance of the reference to the masons depends on complex world knowledge, its complete significance always stumps students even if they understand the double entendre (it also eludes most literary critics).

> ...His [Fortunato's] eyes flashed with a fierce light. He laughed and threw the bottle upward with a gesticulation I did not understand.
>
> I [Montresor] looked at him in surprise. He repeated the movement—a grotesque one.
>
> "You do not comprehend?" he said.
>
> "Not, I," I replied.
>
> "Then you are not of the brotherhood."
>
> "How?"
>
> "You are not of the masons."
>
> "Yes, yes," I said; "yes, yes."
>
> "You? Impossible! A mason?"
>
> "A mason," I replied.
>
> "A sign," he said.
>
> "It is this," I answered, producing a trowel from beneath the folds of my *roquelaire*.
>
> "You jest," he exclaimed, recoiling a few paces....

Nor does any of the texts address the following exchange which occurs during the climax, as Montresor is completing his live entombment of Fortunato:

> "Yes," I [Montresor] said, "let us be gone."
>
> "*For the love of God, Montresor!*" [emphasis in the original]
>
> "Yes," I said, "for the love of God!"

Only the most astute students note this passage in their journals, although class discussion indicates that they rarely understood its significance. Note in Table 2 that one student not only noted the passage but appeared to understand its significance (see Story Element "God, crisis"). However, since she had already studied the story in another course, it was impossible to know if this was her own perception. She was one of the best readers in her class and wrote the best journals on each assignment.

Journal Entries. The questions in Table 2 provide a strong contrast to the adjunct questions. I have provided excerpts to illustrate the diversity of issues and comprehension. A comprehensive listing is outside the scope of this paper. Students' journals on this story spring semester 1992 ranged from 146 to 1,173 words, with a median of 721 and a mean of 644.

Table 2. Excerpts from Students' Journals on "The Cask of Amontillado"

Story Element	Journal Excerpt
Carnival, setting	I can't recall exactly what the carnival season is all about. Isn't it something to do with the Easter season?
Character	It seems that all of the narrator's false concern could be picked up by Fortunato.
Character	The story never mentioned what the real motive for the killing of Fortunato [was]. Was Montresor justified? Was he just plain crazy?
Character	Why did Fortunato trust Montresor enough to go down there if he was such a bad guy and did so many rotten things to Montresor?
Character	Why did Montresor have doubts about the Amontillado?
Character	Why was Fortunato laughing when he was being "walled up"?
Character, plot	I was sure Montresor was just playing a joke on Fortunato.
Character, plot	The narrator makes a big deal about being concerned with Fortunato's health, and asks him several times to leave the catacombs to get away from the damp cellars, not to aggravate Fortunato's cough. Why would he constantly offer to let the man out?
Character, plot	What or why does this man [Montresor] want revenge?
Climax	What is the climax?
God, crisis	The moment of greatest tension is when he is fitting in the last & eleventh final stone in the hole. What is at stake? They say, "For the love of God." Are they going through this for the love of God? What does this line actually refer to? Could it be that God poses a threat to one of these two men?
Irony, Setting	I also think there is some ironic, wry humor concerning Fortunato asking the narrator if he is a mason and the narrator produces a trowel as confirmation. It has occurred to me that such a reference as "supreme madness" of carnival and the ending of the story may leave open the question of whether this tale is an illustration of a mad person.
Luchesi	I don't understand what the character Luchesi has to offer the story....
Luchesi	The narrator is very clever in the way he gets Fortunato to follow him into the vaults. He provides many excuses as to why Fortunato shouldn't necessarily go: too much trouble, he has a cold, [Montresor] has an engagement with Luchesi.
Mason, Character	I wonder if Fortunato was stupid or just too drunk to question "the writing on the wall." Why would Montresor have a trowel under his cloak? Not because he was a "Mason." [This student apparently understood the double entendre.]

Masons	After I read this about 3 times and was writing my first journal it dawned on me that mason in this conversation means two things. Fortunato is talking about a group of people called the Masons, a brotherhood just like there are groups today such as the shriners, or the clan even though they are completely different types of groups, it appears Fortunato is talking about a fighting group the masons. Because again in the beginning of the story, the author tells us he was a strong, respected man. But not a man you could trust. The other kind of mason is the stone mason and the stone mason is what the narrator is.
Masons	I am not sure what the masons/brotherhood had to do with this, but the narrator's production of the trowel reminds me of yet another pun: trowel used for building and masonry.
Masons, irony	One of my favorite elements of irony in the story is when Fortunato asks if Montresor is a mason he is speaking of the brotherhood. [But] When Montresor answers he is speaking of a stone mason since he intends to wall Fortunato up.
Nitre	At the end of the story, "My heart grew sick—on account of the dampness of the catacombs." If nitre seeps through the walls, along with the chill of the air through the walls, [Montresor] could have been feeling pretty bad physically.
Nitre, setting	The nitre on the walls was interesting. I am not sure if I see the connections unless the narrator was trying to tie the explosiveness of the nitre (potassium nitrate used in gunpowder) to the explosiveness of the situation.
Nitre, symbolism	The walls are covered with nitre. There is mention of this several times. I think it symbolizes that Montresor believes that Fortunato "stinks" as a human and is also a "slime."
Plot	Why did they wait 50 years to find the body? [The student mistakenly believes that someone found the body.]
Plot and world knowledge	What was the horrible gesture that Fortunato made in the crypt and what bearing did that have on the story?
Semantic meaning	Impunity was used a lot in the story, but I'm not sure what the meaning is in relationship to the story. Ex. It was used in the introduction and in the motto.
Semantic meaning	What does Poe mean when he says, "A wrong is unredressed when retribution overtakes its redresser"?
Semantic meaning	What exactly did the motto on the coat of arms mean?
Semantic meaning/ world knowledge	What was [a] Mason? Was it a religious group? or the work?
Setting	The story probably takes place during the Renaissance, because the way the author explained what Fortunato was wearing: he was wearing tight-fitting part-striped dress, and he had a conical cap and bells. [The student missed several details which imply the murder occurred in the late 18th century.]
Terminology	Isn't the story dramatic as well as situational irony?

The range illustrated in Table 2 appears to be a function of individual differences; for example, metacognitive sophistication, reading ability, general world knowledge,

and field dependence/independence. (For a detailed discussion of the role of individual differences in journal writing, see Cole, 1992.) Through questions or comments, students may try to (a) clarify facts, and allusions, (b) verify inferences about world knowledge or character motivation, (c) apply literary terminology (e.g., identify instances of foreshadowing, irony, the conflict, the crisis, or the climax), (d) analyze or evaluate the various literary elements (e.g., setting, motivation, or point of view), (e) problem solve to identify the theme, or (f) evaluate a story in terms of its subject or theme, its plausibility, its artistic merit, etc. Equally interesting is the fact that while every class of students *as a whole* tends to have similar questions and comments, each class has unique questions and comments that reveal major bugs in their understanding or astute insights. On the one hand, the similarity between groups of students allows the teacher to utilize a general instructional design; on the other hand, the uniqueness requires "on the fly" adjustments to students' needs.

Formative Evaluation

Not all adjustments must occur "on the fly." Instructional design and development can identify some of the questions and comments during traditional formative evaluation, and provide scaffolding, if appropriate, for future learners. For example, formative evaluation which incorporated student journals could certainly have detected the somewhat common misconception that Montresor was just going to play a joke on Fortunato ("I was sure Montresor was just playing a joke on Fortunato") as well as the reason for this misreading. This is one of the misconceptions that derives from students' inferring inaccurate meanings of the word *immolation* (in the opening of the story), rather than taking time to verify the meaning in a dictionary. Although textbook editors usually footnote definitions of a few of the words in that story (e.g., *pipe*, *roquelaire*, *flambeaux*, *In pace requiescat*), they never include *immolation*; yet, clearly, they should.

But again it is important to emphasize that formative evaluation does not stop when instruction is implemented—it is an ongoing process whose purpose is to improve the product. Because each group of students brings its own needs to the learning situation, every group of students is likely to flush out previously undetected errors or limitations of the instruction.

Implications for Instruction and Learning

Respecting a learner's questions and comments encourages exploration, the student's questions and comments can scaffold his/her own learning. Using a vehicle such as journal writing, by which the learner can share questions and comments in a non-threatening context, gives the teacher the opportunity to (a) monitor the student's comprehension; (b) identify misconceptions which interfere with learning, or insights; and (c) in keeping with the goal of empowering the learner, provide just enough help for the learner to complete the task (e.g., Burton & Brown, 1979; Resnick, 1983).

Student-generated questions and comments can scaffold instructional design, development, and implementation by:

(a) facilitating teacher's decomposing his/her expert knowledge,
(b) helping the teacher assess the students' prior knowledge (including misunderstandings),
(c) providing a basis for selecting and sequencing instruction (the teacher is free to choose whatever sequence and method he/she wishes).

Student-generated questions and comments can serve as an instructional tool in the following ways:

(a) individualizing instruction by identifying problems individual students encounter in interpreting instructional materials;
(b) providing specific feedback in a timely and appropriate manner; for example, the teacher can respond in writing in journals, tutor students, or recommend other remedial or enrichment activities;[8]
(c) developing rapport between student and teacher;
(d) motivating students by encouraging them to interact with text on their own levels.

Journal writing can itself facilitate instruction by providing an incentive to read assignments reflectively before class discussion (e.g., Bauso, 1988; Cole, 1992; Schwartz, 1989). If students have not read an assignment, it is, of course, impossible to engage them in meaningful dialogue in class—identifying and addressing misconceptions and going beyond the foundation provided by the text. Without a meaningful incentive for students not only to read assignments but also to read them reflectively, the best laid plans of instructional designers, developers and teachers often go astray. In my research (Cole, 1992), the brightest student described himself as "lazy" and said he would not have thought about an assignment until class discussion unless he had been required to write journals. He said he found journal writing helpful, and even enjoyed it, and recommended requiring journal writing of future students.

Finally, because reading journals is so time-consuming, after they have read journals on a given work from a couple classes teachers might be tempted not to assign future students journals on that work, basing instruction on the questions and comments of former students. Although each class of students *tends* to address the same issues, teachers should resist such temptations. First, each class raises some unique issues. More importantly, one of the major purposes of journal writing is to help each student become an independent learner. Thus instruction must provide extensive practice for each student to develop his/her ability to identify problems and explore solutions.

Although these implications for instruction and learning focus on the teacher and students, formative evaluation allows them just as readily to translate into benefits for designers and developers.

Recommendations

Students' questions and comments have been relatively discounted in the traditional instructional design, development, and implementation process, yet constructivist paradigm as well as empirical evidence suggests that students' questions and comments have important implications for instruction and learning. While research must try to shed light on this issue, I would like to offer a few recommendations for every instructional project (see Cole [1992] for additional recommendations for implementing journal writing):

1. Determine when students' questions and comments can be elicited and addressed in the instructional design, development, and implementation process.

   In theory, it is desirable to include them at every stage, but this may be impracticable. If so, the layers-of-necessity instructional development model (Tessmer & Wedman, 1990; Wedman & Tessmer, 1990) allows for incorporating

[8]In my research (Cole, 1992), several students identified having their questions answered as the most helpful aspect of journal writing. The implications are that class discussion would not have raised those questions and that they would not have asked those questions, even though the students seemed to participate readily in class.

them in later versions of a project. Implementation should always provide the opportunity for questions and comments.

2. Determine how students' questions and comments can and should be elicited and addressed in the instructional design, development, and implementation process.

   What medium should be used (e.g., class discussion, journals, e-mail, manual,...)? The nature of the domain as well as the task influence this issue. For example, if the task is procedural, the student needs an immediate response, especially if injury could result; a journal would be totally inadequate. If the domain is well-defined, a manual or on-line help system might be appropriate. On the other hand, if the domain is ill-defined and/or the task requires reflection, a journal or some type of collaborative learning (e.g., class discussion or electronic bulletin board) would be appropriate.

   The question of "how" is, of course, related to "when." For example, surveys, interviews, debriefings, think-aloud protocols, on-line help systems, and e-mail might be appropriate in formative evaluations.
3. Consider whether it is important to maintain students' anonymity when they ask questions or comment. You might want to provide more than one vehicle for questions and comments—one public (e.g., class discussion, collaborative groups, e-mail), at least one private (e.g., journals shared only with the teacher, an anonymous electronic bulletin board).
4. Create an environment in which students feel "safe" in asking questions and commenting. Be honest but tactful.
5. Clarify the purpose of questions and comments. For example, if you use journals, discuss the purpose in class. Encourage students to ask questions and comment about the purpose, the procedure, grading criteria, etc. at any time during the course.
6. Provide instructional support for question/comment activities and assignments. For example, if you assign journals, model the process in class; provide ungraded practice; give written models; provide live or CAI tutorials on journal writing; etc.
7. To encourage students to question and comment, respond in a timely way.
8. Use grading criteria and feedback which encourage meaningful questions and comments.
   a. Try to achieve a golden mean in grading. Don't grade "tough"—it doesn't encourage students to explore (e.g., Cole, 1992; Roth, 1985). Don't grade "soft"—most students need the external motivator (e.g., Holland, 1989; Roth, 1985), even when they find journal writing helpful.
   b. Be careful about wording of feedback. Try to encourage students to extend their reach. Don't say, "No, this is wrong." You might ask instead how the student accounts for specific details which conflict with the student's interpretation. When you discuss journal questions and comments in class, don't identify the students but do express support for students' trying to make sense of the assignment (even if they have a partial or wrong interpretation). Emphasize that you don't penalize students for making "wrong" comments, being confused, or asking questions that reveal they don't understand the story.
9. As a part of any mid-course or end-of-course evaluations, ask students to evaluate whatever question/comment strategies you utilize; for example: "What did you find most helpful about writing your journal?" "What did you find least helpful about writing your journal?" "How helpful did you find writing your journal?" (Use a Likert scale.) How helpful were job aids on journal writing, such as student examples?

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